repeated scenes such as I will now attempt to describe to you. In this ideal picture I have endeavoured to depict what I consider to have been the state of things. Here we have the valley of the river some six or seven miles broad. The streams reduced to streamlets meandering through dried and barren sand-banks. Among them are more elevated patches—islands, if we may use the term—islands standing up from the general expanse of sand, and in some cases actual islands in the sense that they were surrounded by water. Here and there pools of water, some almost stagnant, others fed by minute streamlets.

Looking at the scene from a southern standpoint we should see to the north the distant chalk range. Whilst along the shore of the opposite bank of the valley we could with some difficulty detect the various forms of vegetation, which we should see with greater clearness in the more immediate foreground. In this valley a singular stillness must have prevailed, as no trace of animal life whatever has been found, except a feather and a few insect wings blown in from the southern bank.

Of the following at least we are pretty sure, and of numerous others we can be almost sure, but there are indications of very many besides, the relationships of which are at present but imperfectly defined.

Here we should see the graceful fan-palm and the feather palms, adding softness to the view by their elegantly-curved and drooping leaves, laurel and dwarfed oak, stately beeches, clumps of feathery acacia, trellised and festooned with smilax, the trailing aroid, with its large and glossy foliage and an undergrowth of *Mimosa* and of cypress in the swampier ground, and variations in colour caused by the foliage of cinnamon and fig, and the ground clothed with ferns and sedges. On the barren sands of the distant valley are growing clumps of giant and weird-looking cactus. It is not difficult to picture to ourselves the view. (See Fig. 2.)

All this beauty is gone. We have nothing but these records of what must have been a view of great loveliness, which only the toil of the geologist can even faintly reproduce.

> "The hills are shadows, and they flow
> From form to form, and nothing stands;
> They melt like mist, the solid lands,
> Like clouds they shape themselves and go.
>
> "There rolls the deep where grew the tree.
> O Earth, what changes hast thou seen!
> There where the long street roars, hath been
> The stillness of the central sea."

THE REPORT ON THE AUSTRIAN "NOVARA" EXPEDITION

A FEW days ago Admiral v. Wüllerstorff Urbair, late Commander-in-Chief of the Austrian *Novara* Exploring Expedition, had an audience of the Emperor to present to his Majesty the final report on the scientific results of this great exploring cruise round the world. It has required about seventeen years' serious labour, and has cost nearly 13,000*l.* sterling to complete this important scientific work, embracing 18 vols. 4to. and 3 vols. 8vo., and containing the anthropological, botanical, geological, zoological, physico-nautical, statistico-commercial, medical, and descriptive parts.

The narrative of the expedition, written by Dr. Karl von Scherzer (an author also well known in England, and at present attached to the Austro-Hungarian Embassy in London), has met with such a success that five editions have been published and more than 29,000 copies sold.

The most interesting of the purely scientific publications is the geological part, by Dr. Hochstetter, which gives the most complete description of the geology of New Zealand, the author having been the first naturalist who thoroughly explored these antipodean islands, and he has carefully examined and described its gold and coal deposits. The statistico-commercial part, by Dr. Karl von Scherzer, has become quite a standard book on the Continent.

The price of the complete series being very high (391 florins, or nearly 40*l.* sterling), the Emperor has given permission that a considerable number of copies of this most valuable publication should be given away to public institutions and libraries in the empire, as well as in foreign countries, and as the *Novara* has met with a particularly kind reception in the British colonies, the libraries of these have been considered first in the list of recipients of this great national work, which is a monument of scientific investigation.

THE CYCLONE WAVE IN BENGAL

AN interesting correspondence on this subject has appeared in the *Times* during the last few days, evincing generally on the part of the correspondents an earnest effort to arouse the public mind to a sense of the necessity of something being done towards mitigating the calamitous results of such occurrences in the future. The subject being one that must sooner or later be faced, it is beside the question to point to the destructive flooding of the Thames as a proof that the Government of India does not differ greatly in such matters from similar authorities at home.

As regards the meteorology of this important question, three lines of inquiry stand prominently out as calling for special and extended investigation. The first of these is a thorough discussion of the storms of the Bay of Bengal, or a continuation of the work under this head which has been ably begun by Mr. Blanford and Mr. Willson. The second line of inquiry is the cause or causes which originate the cyclone wave and determine the course it takes—a subject on which we cannot be said to have any information at present, all that is or can be said being little more than unsatisfactory conjectures. To carry out these inquiries with the fulness and with the detail required to ensure a successful handling of the subject additional stations must be established and the taking of meteorological observations must be more extensively and frequently done than is now the practice on board the ships which navigate the Bay.

The third line of inquiry is the systematic inauguration of a meteorological survey of the Bay of Bengal and its shores, with a more strict reference to its storms, by having first-class meteorological stations established at Trincomalee, Madras, Vizagapatam, False Point, Saugor Island, Chittagong, Akyab, Cape Negrais, the Andaman and the Nicobar Islands, these stations having a full equipment of instruments, including in each case a continuously registering barometer and anemometer. With these instruments the law of the diurnal oscillation of the barometer and of the changes in the direction and velocity of the wind, including the variations with season, would become known, and any deviation therefrom which may happen to occur, could be telegraphed at once to the head office at Calcutta. It may be regarded as absolutely certain, that no long time would elapse before the nature of the disturbing force, cyclonic or otherwise, revealed by the anomalous readings of the barometer and anemometer would come to be correctly interpreted; and with the aid of frequent telegrams from the whole circuit of stations, so well interpreted that the superintendent at Calcutta would have no difficulty in localising the cyclone, its track and rate of progress would be so certainly known that warning could be sent to the coasts threatened by it.

This system of storm warnings must not be confounded with that practised in Great Britain, in which no refined system of observations is called into play, and in which no accurate knowledge of mean periodic changes is required. What is chiefly required in this country is a

vigilant outlook for what may be called the grosser changes of atmospheric pressure and of the wind, and a very moderate knowledge of meteorology for their interpretation. So clearly is this the case that notwithstanding the great advances made by meteorology in recent years no progress has been made in this country in issuing warnings of the approach of storms, since the number of fresh gales (8 of Beaufort-scale) of which warnings have been sent are still somewhat under the percentage of success attained by Fitzroy in 1864.

But in India it is different. Any system of storm-warnings there, to be successful, must be based on a refined system of observation carried on at a considerable number of stations in such positions as we have pointed out—those positions being selected with special reference to this inquiry.

OUR ASTRONOMICAL COLUMN

AN OBSERVATORY ON ETNA.—Prof. Tacchini sends us a note read before the Accademia Gioenia on September 22, 1876, entitled, "Della convenienza ed utilità di erigere sull' Etna una Stazione Astronomico-Meteorologica," in which after describing his experiences during a brief ascent on September 15-16, he expresses his views with regard to the establishment and most desirable fitting of an observatory on the mountain to be mainly devoted to spectroscopic and meteorological observations.

Prof. Tacchini ascended on the morning of September 15 from Catania to the station occupied by a party of the English and American expeditions on the occasion of the total solar eclipse of December, 1870, and found there a diminution of temperature of 33° Centigrade. He had taken with him a Dollond-telescope of $3\frac{3}{4}$ inches aperture, a spectroscope of strong dispersion by Tauber, a small spectroscope of Jannsen, an aneroid barometer, thermometers, and a polariscope. At 10h. 30m. A.M., on the 16th, a few detached clouds only being present, he remarked that the blue of the sky was much deeper than at Palermo or Catania. The solar light had a special character, it seemed whiter and more tranquil, as though due to artificial illumination by magnesium. Viewing the sun rapidly with the naked eye, it was seen as a black disc surrounded by an aureola of limited extent, projected on the blue ground of the sky. On interposing an opaque body before the disc the aureola was seen better but always limited, and the pure blue sky terminated the same, which extended to rather more than half the solar radius; with the naked eye it was difficult to judge if the aureola was of equal breadth all round the disc, and the only thing well marked was the difference from the view obtained at the level of the sea; while the sky is ordinarily whitish about the sun, on Etna it remained blue, and the aureola acquired a better-defined contour. With a helioscope the aureola was much better seen, and its border appeared irregular, and as though it were rather more extended at four points, which, at noon, corresponded to the extremities of the vertical and horizontal diameters of the disc. At 3 P.M., after interruption from clouds which in passing rapidly at short intervals produced a striking effect by the formation of a stupendous series of coloured rings round the sun containing all the gradations of colour in the spectrum, a phenomenon new to Prof. Tacchini, the Tauber-spectroscope was applied to the telescope for examination of the solar spectrum, and the observer expresses his surprise at the fine definition of the lines and the extraordinary distinctness of the whole; the chromosphere was bright.

In the evening at 10h., the spectacle of the starlit sky was novel and enchanting. Sirius appeared to rival Venus, the finer constellations acquired an altogether special aspect, and the appearance of the Via Lactea was astounding. The image of the planet Saturn was admirable, and the peculiarities of the ring and belts were seen to much greater advantage than at Palermo, shortly before leaving. Venus afforded remarkable proof of the rare quality of the sky of Etna. The planet shone with a powerful light, which cast shadows during the ascent of the mountain; it scintillated frequently like a star. The telescope showed, on the northern part of the phase, an oblong space, less illuminated than the rest of the disc, which Prof. Tacchini says was "sicuramente una macchia del pianeta."

Spectroscopic observations were renewed on the following morning, when the sun had attained an altitude of 10°. The chromosphere was "magnificent;" the inversion of the magnesium and of 1474 was immediately evident, which was not seen at Palermo with the same telescope.

With regard to the proposed observatory which Prof. Tacchini is desirous should be an accomplished fact before the meeting of the scientific bodies at Rome, in September next, he proposes that it should be erected at the *Casina degl' Inglesi*, and should be named after Bellini, and that it should belong to the University of Catania. He suggests that it ought to be provided with a refractor of first-rate quality and of at least 16 centim. (about 6·3 inches) aperture, and he advises that while the meteorological instruments, which should be adapted to the requirements of the day, as indicated by the London Congress, would remain constantly at the Bellini Observatory, a duplicate mounting might be provided for the refractor at some spot within the University of Catania, with its proper dome, the other being fixed on Etna, so that while from June to the end of September astronomical observations could be carried on upon the mountain, during the winter they might be made at Catania, where the sky is a very good one; the astronomer would thus have only the object-glass with its tube to transport to and fro. Prof. Tacchini further suggests that accommodation for visitors should be provided, with the view to increasing their numbers, and that a certain payment should be made by them, to go towards the maintenance of the Observatory and its custodian.

We wish every success to the scheme thus energetically brought before the Italian authorities by Prof. Tacchini, and have no hesitation in predicting important gains to science from its adoption.

THE NEW STAR OF 1604.—The vicinity of this star's place deserves to be closely watched, as it appears by no means improbable that the object may be identified amongst the telescopic stars actually visible, by small fluctuations of brightness, which there are grounds for supposing to have been the case with the so-called new stars of Tycho Brahe and Anthelm.

The best position of Nova 1604, is no doubt that deduced by Prof. Schönfeld from the observations of David Fabricius, found in the *literæ mutuæ* in Fritsch's edition of Kepler's works. Fabricius measured the distance of the new star from ζ, η, α Ophiuchi, α Aquilæ, and α Scorpii, and the discussion of these measures leads to the following place for 1605·0, R.A. 256° 45′ 43″ or 17h. 7m. 2·9s., N.P.D. 111° 4′ 42″, with probable errors of ± 2·0s. and ± 0·65′; this position brought up to 1877·0 is R.A. 17h. 23m. 16s., N.P.D. 111° 22·4′. The nearest catalogued star is one of 8·9 mag. observed in Argelander's Southern Zones, No. 16872 of Oeltzen's reductions. Kepler's star precedes, according to Schönfeld's calculation, 25·3s., and is N. about 0·8′. There is a star 12·13 mag. preceding Argelander's star 18·8s. and 1·6′ to the south, suspiciously close to the recorded place, since the probable errors are no safe guide in such a case as this. Chacornac on Chart No. 52, has a tenth magnitude in about R.A. 17h. 21m. 50s., N.P.D. 111° 22′ for 1855, which is not now visible or was not last summer. But the locality requires a stricter and more systematic examination, which may be suggested to some one of our astronomical readers, who possesses adequate optical power, when this region of the sky is favourably situated for observation.